(12) UK Patent Application (19) GB (11) 2 322 641 (13) A

(43) Date of A Publication 02.09.1998

(21) Application No 9811391.3

(22) Date of Filing 16.11.1995

Date Lodged 27.05.1998

(30) Priority Data
(31) 4441254.1 (32) 19.11.1994 (33) DE

(62) Divided from Application No 9523485.2 under Section 15(4) of the Patents Act 1977

(71) Applicant(s)
Trützschler GmbH & Co. KG
(Incorporated in the Federal Republic of Germany)
Duvenstrasse 82-92, D-41199 Mönchengladbach,
Federal Republic of Germany

(72) Inventor(s)
Konrad Temburg

(74) Agent and/or Address for Service
Abel & Imray
Northumberland House, 303-306 High Holborn,
LONDON, WC1V 7LH, United Kingdom

(51) INT CL[6]
D01G 23/00

(52) UK CL (Edition P)
D1N N1C12 N1C2 N1C4 N1C5

(56) Documents Cited
None

(58) Field of Search
UK CL (Edition P) D1N
INT CL[6] D01G
Online:WPI

(54) Abstract Title
Feeding fibre to an opening machine

(57) In an opening machine, feed tray 2 cooperates with feed roller 1 to feed fibre to opener roller 3, and tray 2 may be moved about centre M of roller 1 along an arcuate path to vary the distance between the tray and opener roller. Movement of tray 2 in direction 41 moves the outlet of the clamping gap between the tray and roller 1 around roller 1 towards roller 3 so that a shorter fibre tuft can be combed off by roller 3.

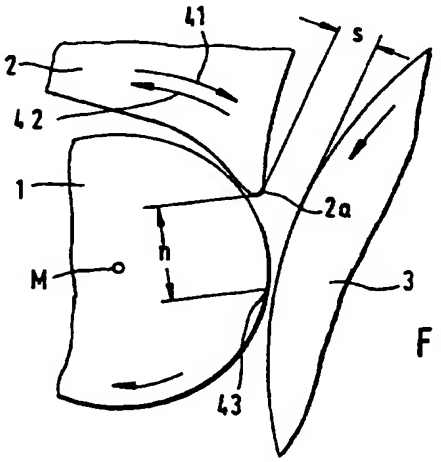


FIG. 13a

GB 2 322 641 A

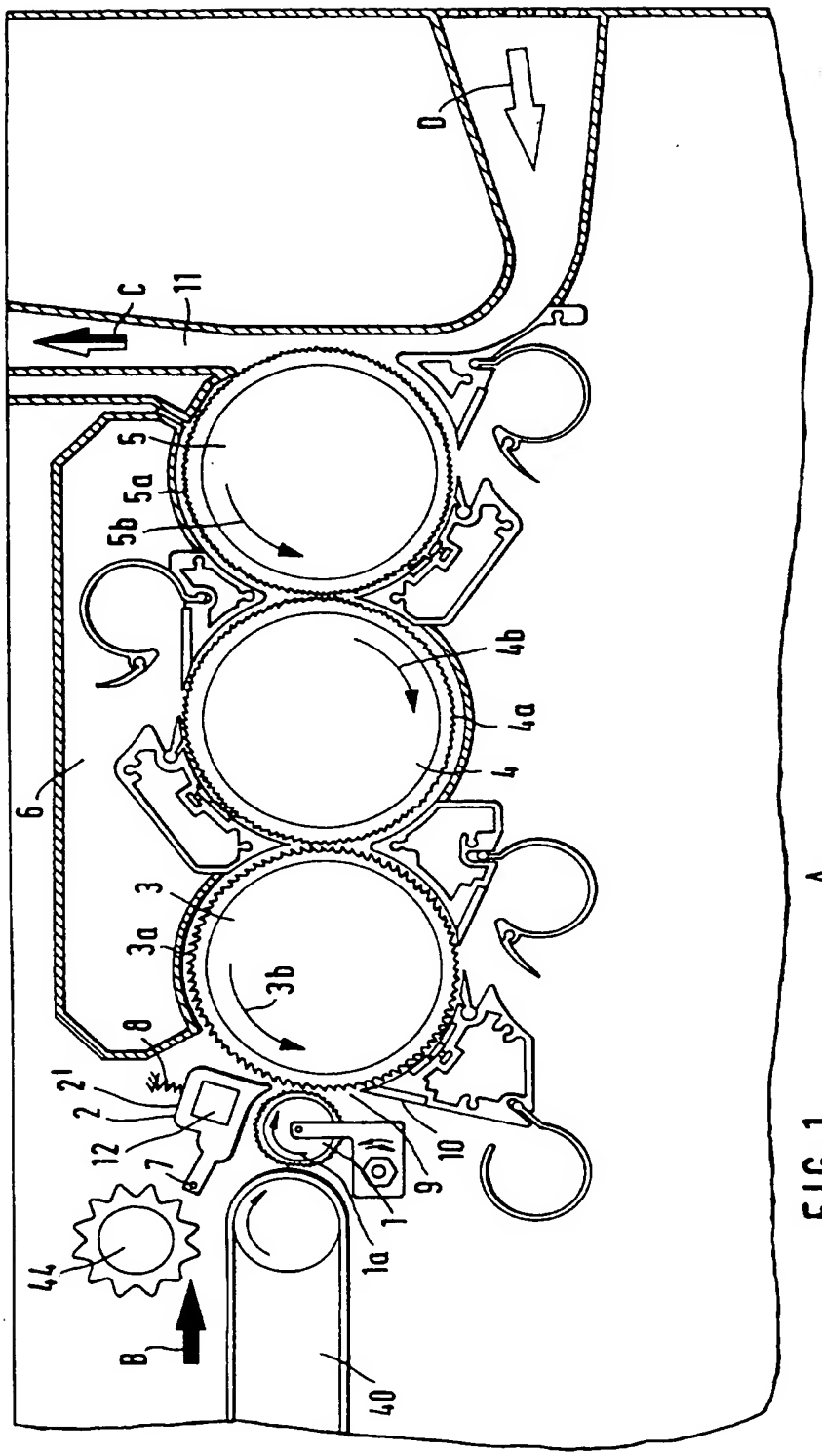


FIG. 1

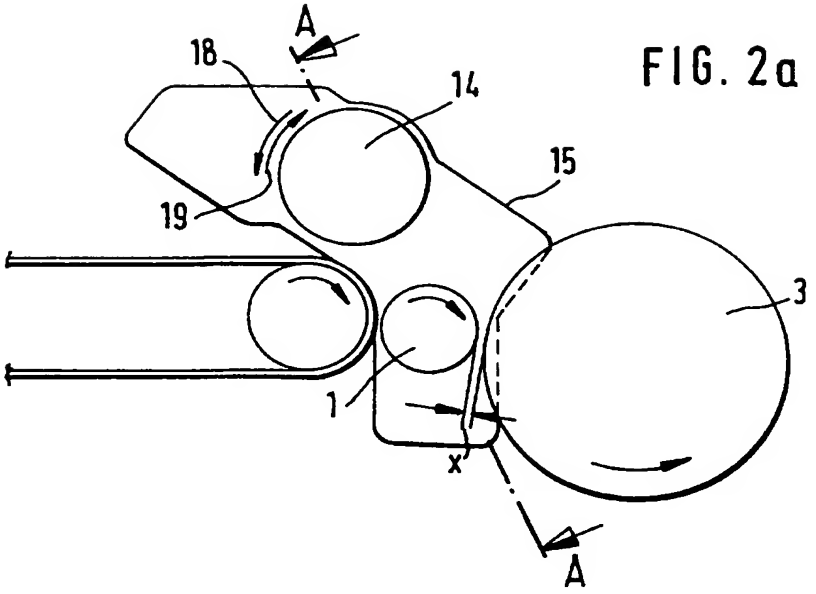


FIG. 2a

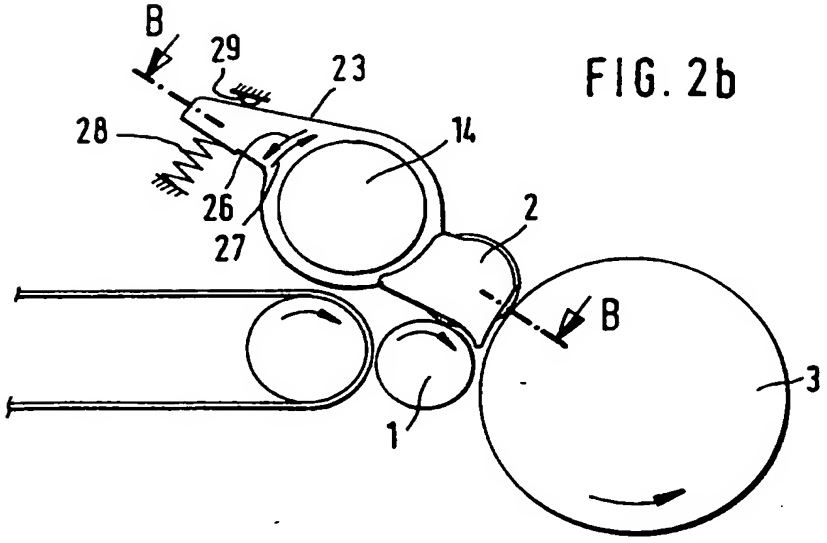


FIG. 2b

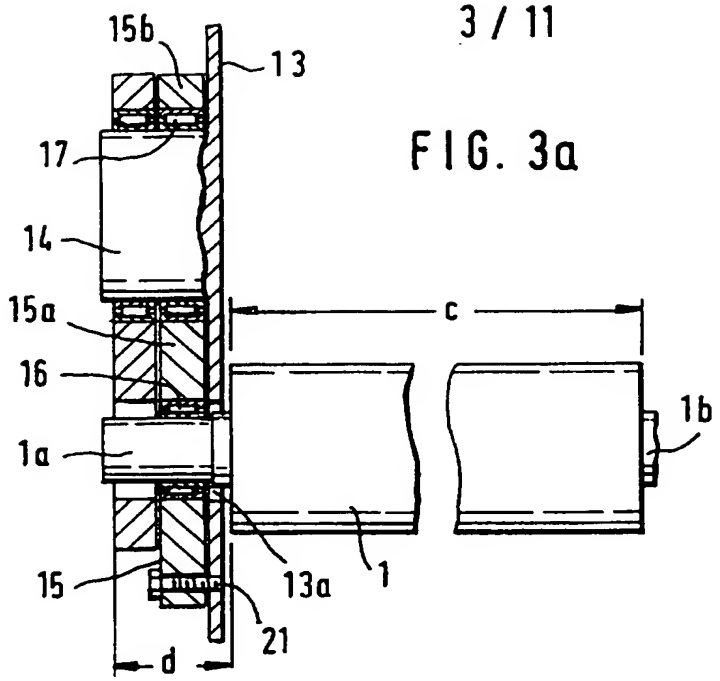

15b
13
17
14
15a
c
16
1b
1a
15
13a
1
21
d

FIG. 3a

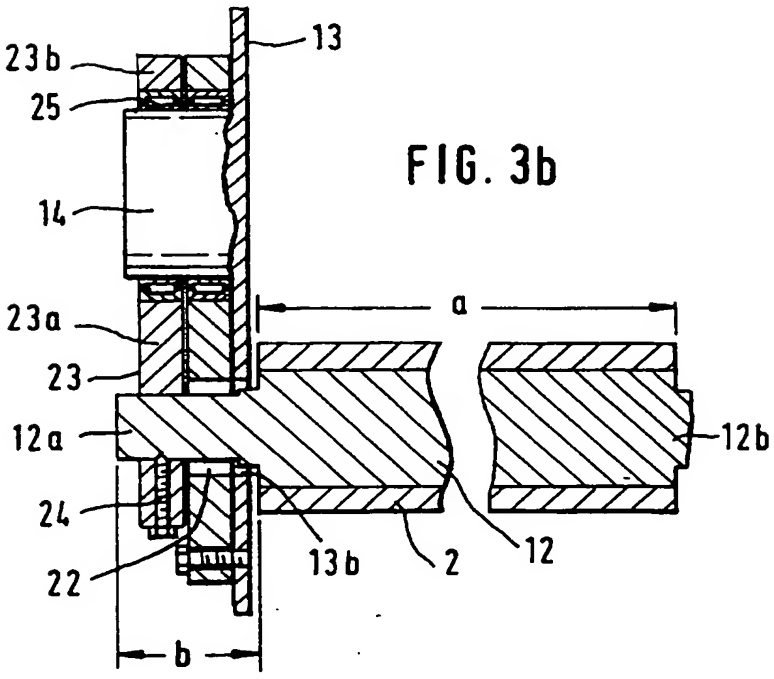

23b
13
25
14
a
23a
23
12a
12b
24
22
13b
2
12
b

FIG. 3b

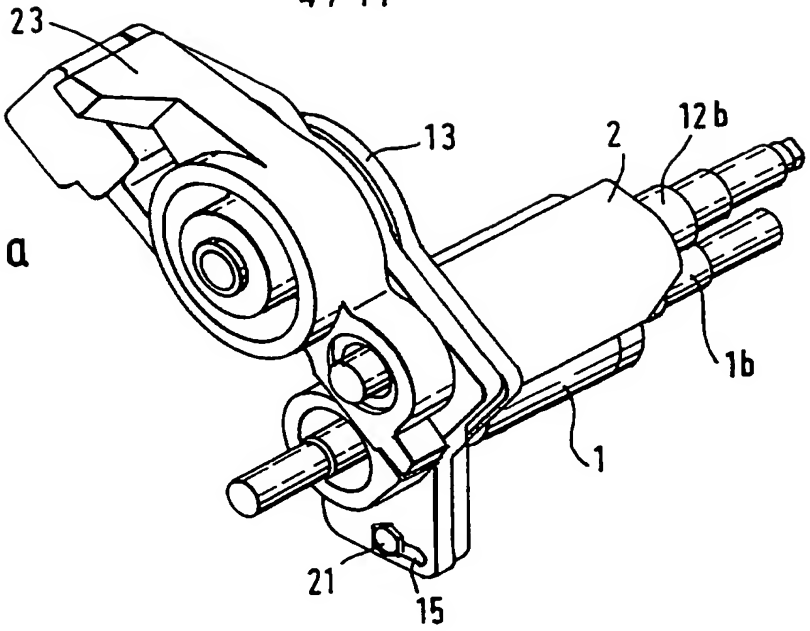

23
13
2
12b
1b
1
21
15

FIG. 4a

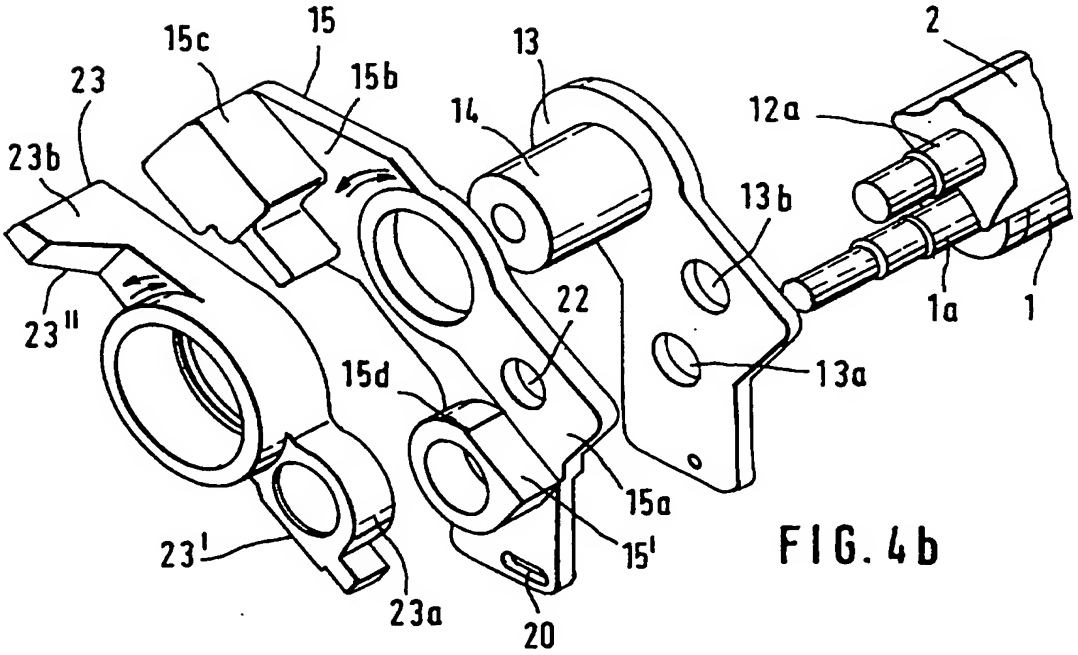

15
15c
15b
23
23b
23''
13
14
2
12a
13b
1a
1
22
15d
13a
15a
15'
23'
23a
20

FIG. 4b

FIG. 5a

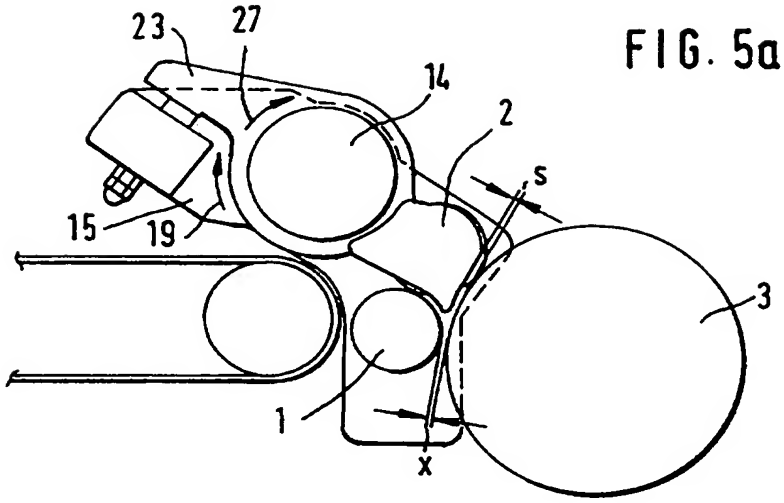


FIG. 5b

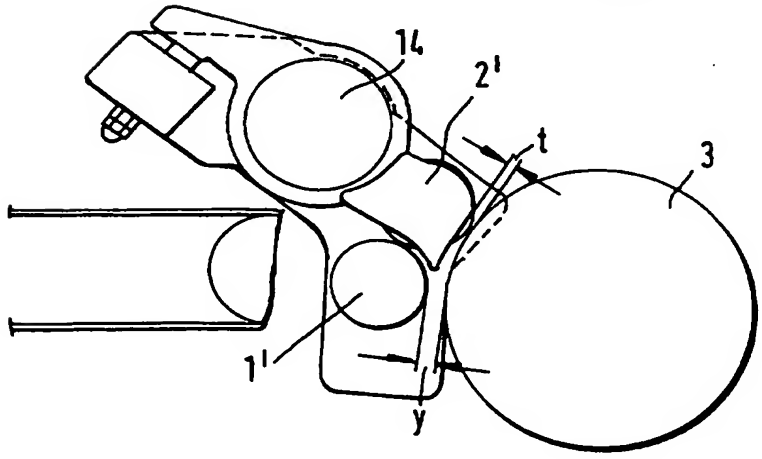


FIG. 6a

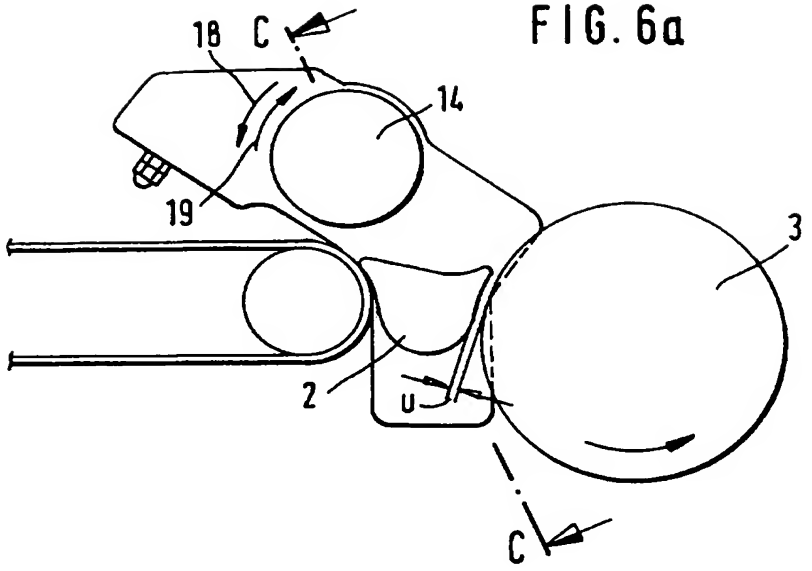
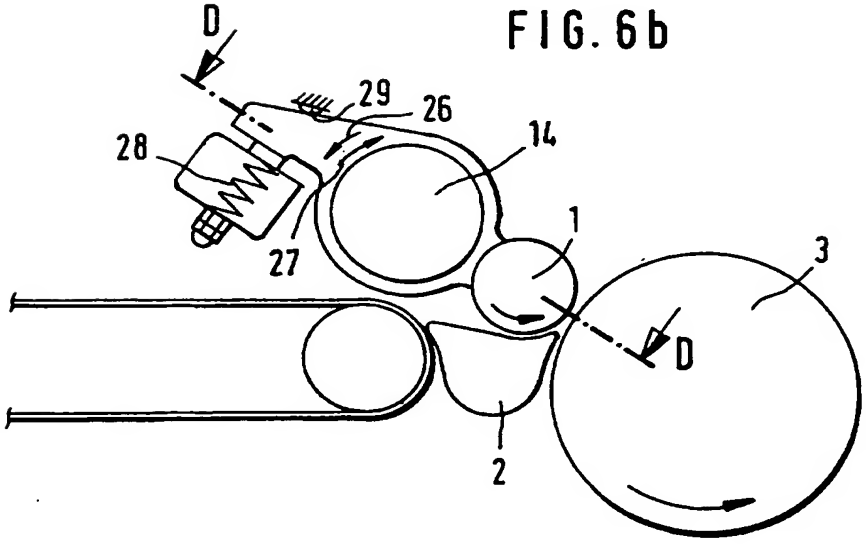


FIG. 6b



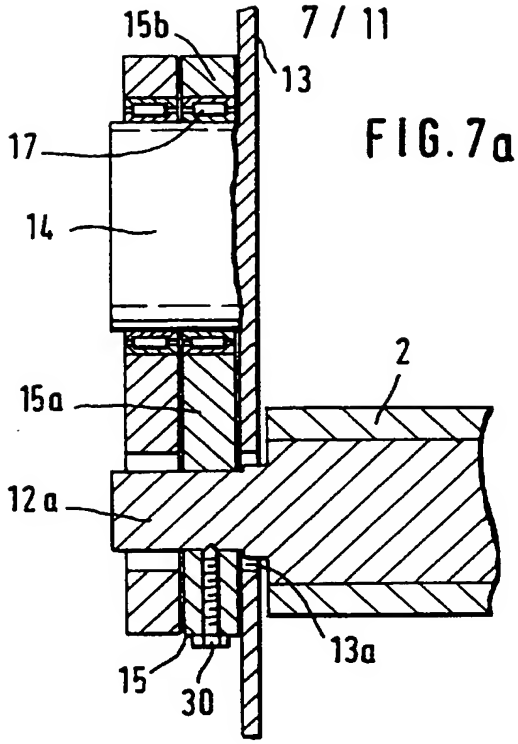


FIG. 7a

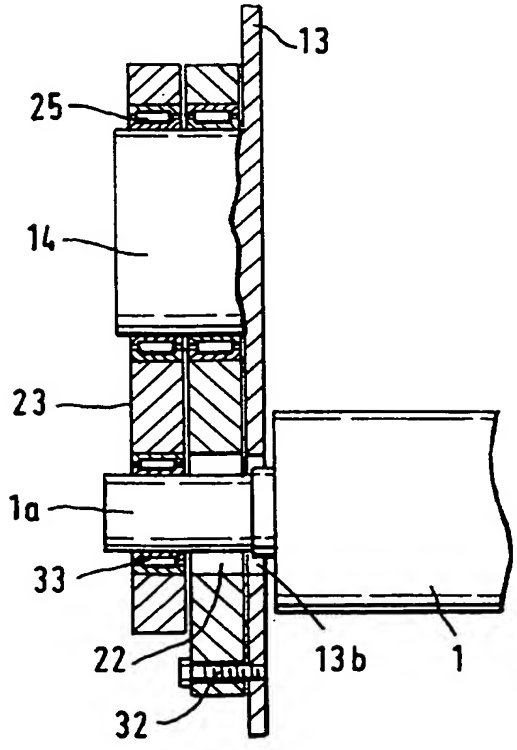


FIG. 7b

FIG.8a

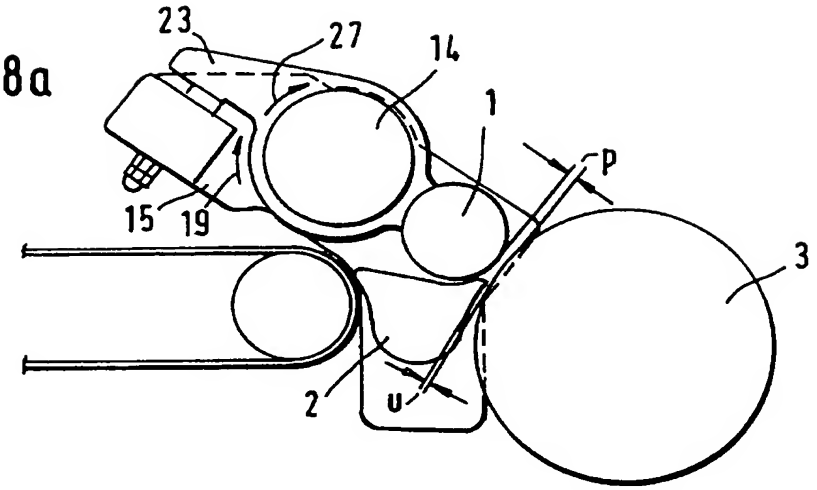
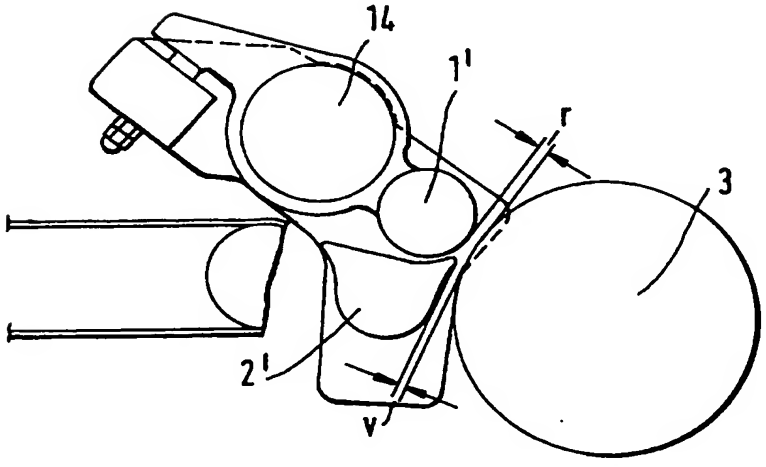


FIG.8b



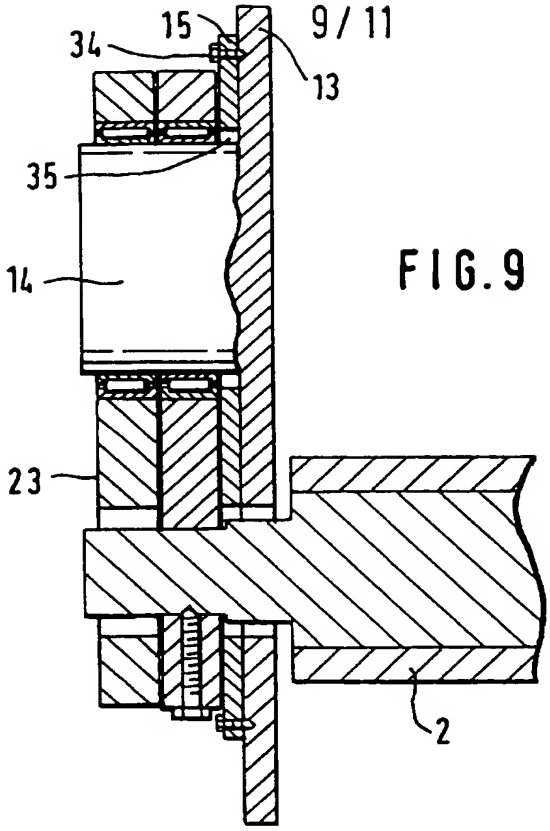


FIG. 9

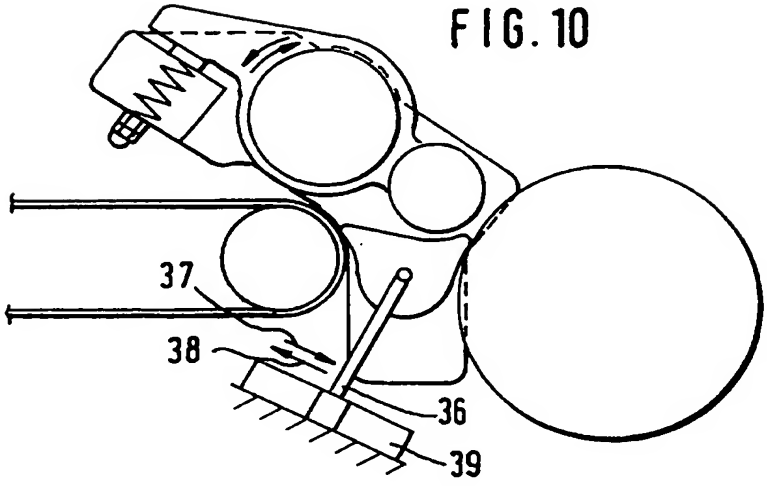


FIG. 10

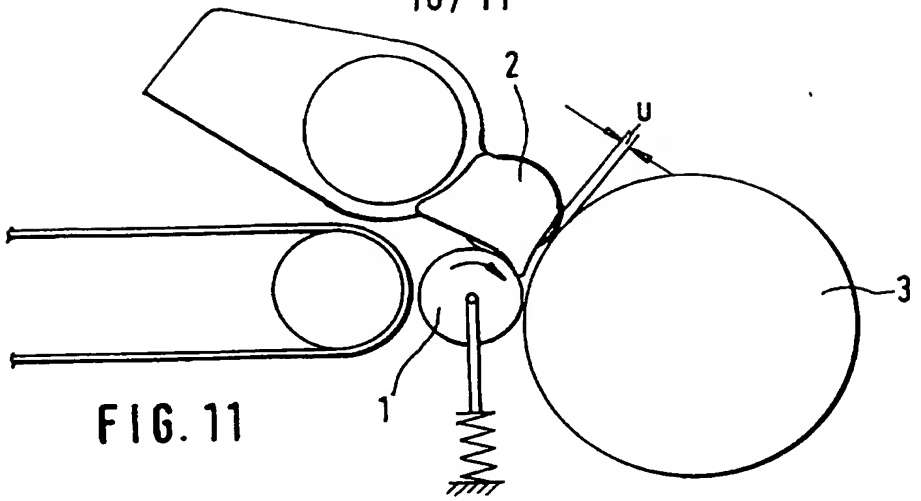
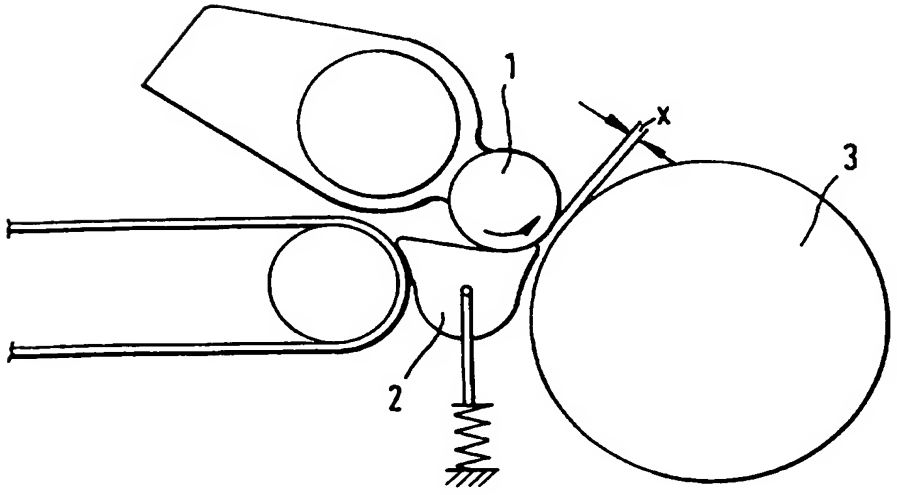


FIG. 11

FIG. 12



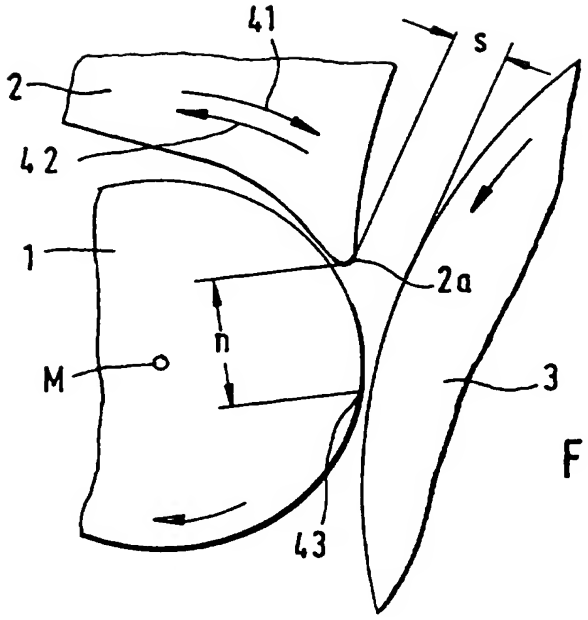


FIG. 13a

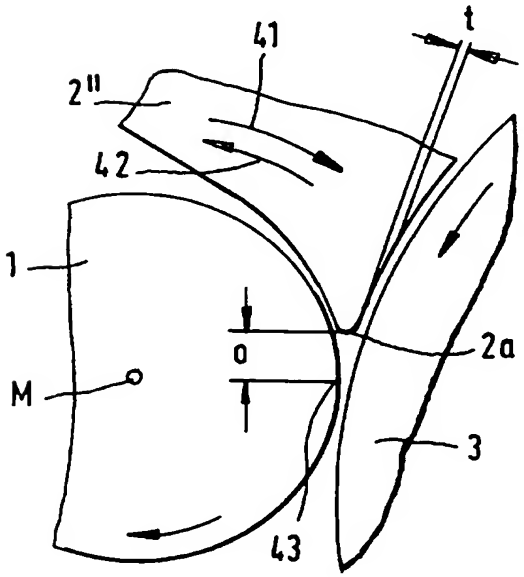


FIG. 13b

Apparatus and method for feeding fibre material to a textile machine.

The invention relates to an apparatus and method for feeding fibre material to a textile machine. More particularly, but not exclusively, the invention relates to an apparatus and method for opening and cleaning fibre material in the form of flocks, for example cotton, synthetic fibre material and the like, in which the fibre material passes through an intake device, for example an intake roller cooperating with a tray and thereafter at least one opener device, for example opener rollers having a cleaning device, and is then conveyed to a processing machine.

In a known apparatus, there is an intake device having an intake roller which cooperates with an intake tray. The intake tray is arranged to be movable during operation to enable the fibre material to be gripped between the tray and the intake roller. The distance between the intake roller and the downstream opener roller can be designed for a selected type of fibre material, operating conditions or the like, but it is possible that the fibre may be damaged when processing is carried out with different fibre materials, or under different operating conditions or the like.

It is an object of the invention to provide an apparatus and method for feeding fibre material to a textile machine in which the processing of fibre material

can be improved, while the gripping of the fibre can be troublefree, and the apparatus can be simple to produce.

According to the invention there is provided an apparatus for feeding fibre material in the form of flocks, the apparatus comprising an intake device including fibre transport elements which cooperate with one another to transport fibre material and an opener device to which the fibre material is arranged to be fed by the fibre transport elements of the intake device, wherein the distance between at least one of the fibre transport elements of the intake device and the opener device is adjustable.

According to the invention there is also provided an apparatus for opening and cleaning fibre material in the form of flocks, for example cotton, synthetic fibre material and the like, in which the fibre material passes through an intake device, for example an intake roller cooperating with a tray and thereafter at least one opener device, for example an opener roller having a cleaning device, and is then conveyed to a processing machine, characterised in that the distance between the intake roller and the downstream opener roller is adjustable.

The adjustability of the distance between the slow-speed intake roller and the downstream high-speed opener roller makes it possible to avoid damage to the fibre material when different types of fibre material are processed or in the event of alterations to the operating

conditions or the throughput of fibre material. The transfer of fibre material from the intake roller and its being taken up by the opener roller is improved in accordance with the type of fibre, for example in the case of a different length of fibre. The apparatus according to the invention is advantageous especially in the case of relatively long fibres and high output.

Advantageously the position of the intake roller can be altered along a curved path, for example a circular path. Preferably the intake roller is mounted in adjusting elements. Preferably each adjusting element is fastened, for example to the wall of the frame, by at least one fastening element, for example a screw. Advantageously the screw can be loosened and locked. Advantageously the screw projects through an elongate hole. Preferably the adjusting element is rotatable about a pivot, for example a bearing journal. Preferably the adjusting element is rotatably mounted on the bearing journal by means of ball bearings. Advantageously an adjusting device, for example an adjusting screw, is associated with the adjusting element. Advantageously adjusting markings, for example a scale, are associated with the adjusting screw. Preferably the intake tray is mounted in holding elements, for example a double lever arm. Preferably the holding elements are mounted on the bearing journal by means of ball bearings. Advantageously the holding elements are loaded, for example by a spring. Advantageously a stop is associated with the holding

element. Preferably the distance between the intake tray and the opener roller is altered positively (indirectly).

According to a further preferred embodiment of an apparatus for opening and cleaning fibre material in the form of flocks, for example cotton, synthetic fibre material and the like, in which the fibre material passes through an intake device, for example an intake roller cooperating with a tray and thereafter at least one opener device, for example an opener roller having a cleaning device, and is then conveyed to a processing machine, the distance between the intake tray and the downstream opener roller is adjustable. The adjustability of the distance between the intake tray and the downstream high-speed opener roller makes it possible to avoid damage to the fibre material when different types of fibre material are processed or in the event of alterations to the operating conditions or the throughput of fibre material. The transfer of fibre material from the intake tray and its being taken up by the opener roller is improved in accordance with the type of fibre, for example in the case of a different length of fibre. In particular, it is possible for the distance between the clamping point and the opener roller to be narrow so that the apparatus advantageously can process shorter fibres, for example waste fibres.

Advantageously the position of the intake tray can be altered along a curved path, for example a circular path. Preferably the intake tray is mounted in adjusting

elements. Preferably each adjusting element is fastened, for example to the wall of the frame, by at least one fastening element, for example a screw. Advantageously the screw can be loosened and locked. Advantageously the screw projects through an elongate hole. Preferably the adjusting element is rotatable about a pivot, for example a bearing journal. Preferably the adjusting element is rotatably mounted on the bearing journal by means of ball bearings. Advantageously an adjusting device, for example an adjusting screw, is associated with the adjusting element. Advantageously adjusting markings, for example a scale, are associated with the adjusting screw. Preferably the intake roller is mounted in holding elements, for example a lever arm. Preferably the holding devices are mounted on the bearing journal by means of ball bearings. Advantageously the holding devices are loaded, for example by a spring. Advantageously a stop is associated with the holding elements. Preferably the distance between the intake roller and the opener roller is altered positively (indirectly).

Preferably the bearing journal is fastened to a fixed wall, for example the wall of the frame. Preferably the position of the intake roller and the intake tray can be altered about a common pivot, for example a bearing journal. Preferably the clamping distance between the intake roller and the intake tray remains substantially the same after alteration of the distance between the opener roller and the intake roller or intake tray. As a

result, the troublefree clamping action on the fibre material in the clamping gap is retained. Advantageously there are through openings in the walls of the frame. Advantageously there are through openings in the adjusting elements. Preferably a surface of the adjusting element and a surface of the holding element are in engagement with one another. Preferably the intake roller is arranged above the intake tray. Advantageously the intake tray is arranged above the intake roller. Advantageously the intake roller is variable in position, for example displaceable, together with the intake tray. Preferably the intake tray is rotatable about the middle point of the intake roller. Preferably the distance between the outlet edge of the intake tray and the point of fibre transition from the intake roller to the opener roller is adjustable.

The present invention further provides a method of feeding fibre to a textile machine, the method employing an apparatus as defined above.

By way of example certain embodiments of the invention will now be described with reference to the accompanying drawings, of which:

Fig. 1 is a diagrammatic side view of an apparatus according to the invention having an adjustable feed roller and a resiliently mounted feed tray on a cleaner having three opener rollers,

Fig. 2a is a side view of a modified form of part of the apparatus in Fig. 1, and shows a bottom-mounted adjustable feed roller,

Fig. 2b is a side view of the same apparatus of Fig. 2a but shows a top-mounted spring-loaded feed tray,

Fig. 3a is a cross-section on the lines A-A of Fig. 2a,

Fig. 3b is a cross-section on the lines B-B of Fig. 2b,

Fig. 4a is a perspective view of the apparatus according to Figs. 2a, 2b, 3a and 3b in an assembled state,

Fig. 4b is an exploded view of the apparatus of Fig. 4a,

Figs. 5a, 5b show adjustment of the apparatus for alteration of the distance between the feed roller and a downstream opener roller,

Fig. 6a is a side view of a modified form of the apparatus of Figs. 2a to 5b and shows a

bottom-mounted adjustable feed tray,

Fig. 6b is a side view of the apparatus of Fig. 6a but shows a top-mounted spring-loaded feed roller,

Fig. 7a is a cross-section on the lines C-C of Fig. 6a,

Fig. 7b is a cross-section on the lines D-D of Fig. 6b,

Figs. 8a, 8b show adjustment of the apparatus of Figs. 6a to 7b for alteration of the distance between the feed tray and the downstream opener roller,

Fig. 9 shows a further modified form of apparatus having eccentric pivots,

Fig. 10 shows another form of apparatus wherein the feed roller and feed tray are displaceably mounted,

Fig. 11 shows another form of apparatus having a bottom-mounted spring-loaded feed roller and a top-mounted adjustable feed tray,

Fig. 12 shows another form of apparatus having a bottom-mounted spring-loaded feed tray and a top-mounted adjustable feed roller, and

Figs. 13a, 13b show another form of apparatus having an arrangement for the alteration of the distance between an outlet edge of the feed tray and the fibre transfer point.

The same reference numerals are used in the drawings to designate the same or similar parts in different embodiments of the invention.

The cleaning apparatus according to Fig. 1, which may be for example generally in the form of the cleaner sold by Trützschler GmbH & Co. KG as the CVT cleaner is arranged in a closed housing. The apparatus is supplied with fibre material B to be cleaned, which may especially be cotton, in the form of flocks. The supply is effected, for example, by means of a filling chute (not shown), a conveyor belt or the like. The cotton fibre material is supplied, while being gripped, by means of an intake roller 1 (feed roller) and an intake tray 2 (feed tray) to a high-speed pin roller 3 (diameter, for example 250 mm) which is rotatably mounted in the housing and rotates counterclockwise (arrow 3b) as viewed in Fig. 1. Arranged downstream of the pin roller 3 are a clothed roller 4 and a clothed roller 5. The clothed roller 4 is provided with saw-tooth clothing and has a diameter of,

for example, 250 mm. The roller 3 has a circumferential speed of, for example, 15 m/sec, and the roller 4 has a circumferential speed of, for example, 20 m/sec. The circumferential speed of roller 5 is greater than the cirumferential speed of roller 4; the diameter of roller 5 is, for example, 250 mm. The pin roller 3 is surrounded by the housing 6. Associated with the pin roller 3 is a separating opening 9 for the discharge of fibre impurities, the size of which opening is matched, or can be matched, to the degree of contamination of the cotton. Associated with the separating opening 9 is a separating edge 10, for example a blade.

The intake device consists of the slow-speed feed roller 1, which rotates in the direction of arrow 1a, and the feed tray 2, which is arranged above the feed roller 1. The tray 2 is mounted at one end 2a in a pivot bearing 7. Associated with the outer upper surface 2' of the tray 2 is a compression spring 8 which resiliently biases the tray 2. The feed roller 1 is rotatably mounted in a fixed position.

The mode of operation is as follows: the cotton fibre material B consisting of fibre flocks is supplied, while being gripped or clamped, by the feed roller 1 cooperating with the feed tray 2 to the pin roller 3 which combs the fibre material B and takes up fibre tufts on its pins. As the roller 3 passes the separating opening and the separating edge 10, in accordance with the circumferential speed and the curvature of that

roller and the size of the separating opening 9, which has been matched to this first separation stage, short fibres and coarse impurities are flung out from the fibre material by centrifugal force. The fibre material that has been pre-cleaned in this way is removed from the first roller 3 by the points 4a of the clothing of the clothed roller 4, the fibre material being further opened. The fibre material is then taken up by the points 5a of the clothing of the roller 5, which is mounted downstream of the roller 4 in the direction of operation A, opened further and finally supplied via a pneumatic suction removal device 11 to a processing machine (not shown).

The intake tray 2 is an aluminium extruded section having a cavity 2a through which a rod-shaped steel core 12 extends across the width of the machine (see Figure 3b). The steel core 12 is resistant to bending and prevents the feed tray from sagging undesirably over its width a. As shown in Figs. 3b and 7a, the steel core 12 which extends through the intake tray 2 has at both its ends lugs or projections 12a, 12b which each project through respective openings 13b in the wall 13 of the frame. The projections 12a, 12b project beyond the feed tray 2 by the distance b. The projection 12a is fastened, for example by a screw 24, in one lever arm 23a of a holding element 23 that is rotatable in the direction of arrows 26, 27 (Fig. 2b) and is in the form of a double armed lever. The holding element 23 is rotatable, for

example by means of ball bearings 25, about a cylindrical bearing journal 14 which is rigidly connected to the wall 13 of the frame. Associated with the other lever arm 23b are a compression spring 28, against which the intake tray 2 yields in the event of a change in thickness of the cotton fibre material B, and a stop 29 which limits the gap between the feed roller 1 and the feed tray 2. Projection 12b may be fastened in a similar manner on the other side of the machine.

As shown in Figs. 2a and 3a, there is an opening 13a, for example in the wall 13 of the frame, through which opening a journal part 1a of the feed roller 1 projects (on the opposite side of the machine there is an opening 13a' for the journal 1b in the wall 13' of the frame (not shown)). Mounted on the outside of the wall 13 of the frame is a cylindrical bearing journal 14. Furthermore, on the side of the wall 13 of the frame that is remote from the feed roller 1 there is a double-lever-like adjusting element 15, in the lever arm 15a of which the journal part 1a is mounted by means of ball bearings 16. The adjusting element 15 is mounted on the bearing journal 14 by means of ball bearings 17 to be rotatable in the direction of arrows 18, 19. In the adjusting element 15 there is an elongate hole 20 (see Figs. 4a, 4b) through which an adjustable and lockable screw 21 projects and engages in a thread in the wall 13 of the frame. The peripheries of the slow-speed feed roller 1 and the high-speed opener roller 3 are spaced at a

distance x from one another.

As shown in Figs. 2b, 3b, the projection 12a of the steel core 12 of the intake tray 2 projects through the opening 13b. (On the opposite side of the machine, the projection 12b projects through a corresponding opening 13b', not shown). The projection 12a further projects through an opening 22 in the adjusting element 15. Parallel to the adjusting element 15 is a double-ended-lever-like holding element 23, in the lever arm 23a of which the journal 12a is fastened by way of a screw 24. The holding element 23 is mounted on the bearing journal 14 by means of ball bearings 25 to be rotatable in the direction of arrows 26, 27. The lever arm 23b is biased by a spring 28 and rests against a stop 29 so that the feed roller 1 and the feed tray 2 do not come into contact with one another and the minimum gap between them is limited.

Referring to Figs. 4a, 4b the compression spring 28 (not shown) is located in the projection 15c and presses against the surface 23" of the lever arm 23b, as a result of which the surface 23' of the lever arm 23a rests against the surface 15' of the projection 15b (see Fig. 4a) when fibre is not being gripped and thereby limits the movement of the feed tray 2 towards the feed roller 1. The pressing action of the spring 28 can be adjustable.

When the screw 21 is loosened and the adjusting element 15 is rotated in the direction of arrow 19

(Fig. 5a), then the distance x (Fig. 5a), for example 1.3 mm, is increased to distance y (Fig. 5b), for example 2.5 mm. The feed roller 1 (Fig. 5a) moves to position 1' (Fig. 5b). Simultaneously distance s (Fig. 5a) is increased to distance t (Fig. 5b). The intake tray 2 (Fig. 5a) moves to position 2' (Fig. 5b). Whilst distance x is altered directly by the adjusting screw 21, distance s is altered indirectly (positively) by the coupling between the adjusting element 15 and the holding element 23. In that manner, the distance between the outlet of the gripping point (the nip between the intake roller 1 and the intake tray 2) and the opener roller 3 is increased or, in the case of rotation in the opposite direction, reduced. Simultaneously the holding element 23 is rotated in the same direction 27 by the pressure of the spring 28 coaxially about the bearing journal 14 so that the surfaces 15' and 23' remain, unchanged, resting against one another (see Fig. 4a). As a result, the distance between the feed roller 1 and the feed tray 2 (clamping distance in the clamping or gripping gap for the fibre material B) and the biasing force between those elements remains the same. The screw 21 is then retightened.

Referring now to Figs. 6a and 7a, there is an opening 13a, for example in the wall 13 of the frame, through which opening the projection 12a of the steel core 12 of the feed tray 2 projects. On the outside of the wall 13 of the frame is the cylindrical bearing

journal 14. Furthermore, on the side of the wall 13 of the frame that is remote from the feed tray 2 is the adjusting element 15 having a double lever arm, in the lever arm 15a of which the projection 12a is mounted and fastened by a screw 30. The adjusting element 15 is mounted on the bearing journal 14 by means of ball bearings 17 to be rotatable in the direction of arrows 18, 19. In the adjusting element 15 is the elongate hole 20 (cf. Fig. 4b) through which an adjusting and locking screw 32 projects and engages in a thread in the wall 13 of the frame. The edge 2a or rounded nose of the intake tray 2 and the periphery of the opener roller 3 are spaced at a distance u from one another.

Referring now to Figs. 6b, 7b, the journal part 1a of the roller 1 projects through the opening 13b. The journal part 1a further projects through the opening 22 in the adjusting element 15. Parallel to the adjusting element 15 is the holding element 23 having a double lever arm, in the lever arm 23a of which the journal part 1a is mounted by means of ball bearings 33. The holding element 23 is mounted on the bearing journal 14 by means of ball bearings 25 to be rotatable in the direction of arrows 26, 27. The lever arm 23b is loaded by the spring 28 and rests against the stop 29. The holding device 23 engages with the adjusting element 15 in the manner described in connection with Figs. 4a, 4b.

When the screw 32 is loosened and the adjusting element 15 is rotated in the direction of arrow 19

(Fig. 8a), distance u (Fig. 8a) is increased to distance v (Fig. 8b). The feed tray 2 (Fig. 8a) moves to position 2' (Fig. 8b). Simultaneously distance p (Fig. 8a) is increased to distance r (Fig. 8b). The intake roller 1 (Fig. 8a) moves to position 1' (Fig. 8b). Whilst distance u is directly altered by the adjusting screw 32, distance p is altered indirectly (positively) by the coupling between the adjusting element 15 and the holding element 23. In that manner, the distance between the outlet of the gripping point (the nip between the intake roller 1 and the intake tray 2) and the opener roller 3 is increased or, in the case of rotation in the opposite direction, reduced. Simultaneously the holding element 23 is rotated by the pressure of the spring 28 in the same direction 27 so that the surfaces 15' and 23' remain, unchanged, resting against one another (see Fig. 4a). As a result, the distance between the feed roller 1 and the feed tray 2 (clamping distance in the clamping or gripping gap for the fibre material B) and the biasing force between those elements remains the same even after a rotation of the adjusting element and of the holding element and an alteration in the distance between the feed tray 2 and the opener roller 3. The screw 32 is then retightened.

Referring now to the modified arrangement of Fig. 9, the adjusting element 15 is fastened to the wall 13 of the frame by means of a screw 34 which simultaneously forms a pivot bearing for the adjusting element 15.

Whilst the holding element 23 is rotatable about the bearing journal 14, the adjusting element 15 is rotatable, paraxially thereto, about the pivot bearing formed by the screw 34. An opening 35, through which the bearing journal 14 projects, is provided in the adjusting element 15 to allow the movement.

Referring now to a further modification shown in Fig. 10, the feed roller 1 and the feed tray 2 are mounted on a holding device 36 which is displaceable in the direction of arrows 37, 38 on a fixed base device 39. In that manner, the distance between the feed roller 1 and the feed tray 2 on the one hand and the periphery of the opener roller 3 on the other hand can be altered or adjusted.

The invention has been illustrated using the example of a machine having a bottom-mounted adjustable feed roller and a top-mounted spring-loaded feed tray (Figs. 2a, 2b, 3a, 3b, 4a, 4b, 5a and 5b) and a machine having a bottom-mounted adjustable feed tray and a top-mounted spring-loaded feed roller (Figs. 6a, 6b, 7a, 7b, 8a and 8b). The invention includes also an apparatus having a bottom-mounted spring-loaded feed roller and a top-mounted adjustable feed tray (Fig. 11) and an apparatus having a bottom-mounted spring-loaded feed tray and a top-mounted adjustable feed roller (Fig. 12).

In Fig. 1, the reference numeral 40 denotes a conveyor belt and the reference numeral 44 denotes a pressing roller for the fibre material B.

Referring to Figs. 13a, 13b, the feed tray 2 is rotatable in the direction of arrows 41, 42 about the middle point M of the feed roller 1. When the feed tray 2 is rotated in the direction of arrow 41 from the position shown in Fig. 13a to position 2" shown in Fig. 13b, distance s (Fig. 13a) is reduced to distance t (Fig. 13b). In that manner, the outlet of the clamping gap (the nip between the feed roller 1 and the feed tray 2) is displaced along the periphery of the intake roller 1. As a result, the outlet of the clamping gap moves closer to the fibre transition point 43 so that as a result a fibre tuft having shorter fibres can be combed off by the opener roller 3. Simultaneously the distance between the outlet edge 2a or nose of the feed tray 2 and the point 43 of fibre transition between the feed roller 1 and the opener roller 3 is reduced from distance n (Fig. 13a) to distance o (Fig. 13b). The position of the feed roller 1 is not changed.

Claims

1. An opening machine comprising an intake device including fibre transport elements which cooperate with one another to transport fibre material, the fibre transport elements including a feed roller and a feed tray, and an opener device to which the fibre material is arranged to be fed by the fibre transport elements of the intake device, wherein the distance between the feed tray and the opener device is adjustable by movement of the feed tray along an arcuate path whose centre lies substantially on the axis of rotation of the feed roller.

2. A machine according to claim 1, in which the intake device includes a pair of cooperating fibre transport elements for feeding fibre to the opener device, wherein the distance between the pair of fibre transport elements on the one hand and the opener device on the other hand is adjustable.

3. A machine according to claim 2, in which one of the pair of fibre transport elements is mounted in an adjustable support.

4. A machine according to claim 1, in which at least one fibre transport element is mounted in an adjustable support.

5. A machine according to claim 3 or 4, in which the adjustable support is fastenable to a mounting in a

plurality of different positions to adjust the distance between said at least one fibre transport element and the opener device.

6. A machine according to claim 5, in which the adjustable support is fastenable by a screw fastening, can be adjusted after loosening the screw and fixed in position by tightening the screw.

7. A machine according to claim 5 or 6, in which the adjustable support is secured via an elongate hole in the mounting.

8. A machine according to any one of claims 5 to 7, in which the mounting is a part of the frame, or a part fixed to the frame, of a textile machine.

9. A machine according to any one of claims 3 to 8, in which the adjustable support is pivotally mounted.

10. A machine according to any one of claims 3 to 9, in which adjusting movement of the adjustable support is controlled by a screw threaded adjusting means.

11. A machine according to claim 10, in which the screw threaded adjusting means includes markings for indicating the amount of adjustment.

12. A machine according to any one of claims 3 to 10, in which the adjustable support is a double armed lever, one arm of which is adjustably securable and the other arm of which carries the fibre transport element that is mounted on the adjustable support.

13. A machine according to claim 3 or any one of claims 5 to 12 when dependent upon claim 3, in which the other

of the pair of fibre transport elements is mounted in a movable support.

14. A machine according to claim 13, in which the movable support is a double armed lever.

15. A machine according to claim 13, in which each of the pair of fibre transport elements is mounted for pivotal movement.

16. A machine according to claim 15, in which the axis of pivoting of each of the pair of fibre transport elements is substantially the same.

17. A machine according to claim 16, in which the adjustable support and the movable support are mounted for pivotal movement about a common point.

18. A machine according to any one of claims 13 to 17, in which the other of the pair of fibre transport elements is mounted for movement towards and away from said one of the pair of fibre transport elements and is biased towards said one of the pair of fibre transport elements.

19. A machine according to claim 18, in which the bias is provided by a spring.

20. A machine according to claim 17 or 18, in which movement of the other of the pair of fibre transport elements towards said one of the pair of fibre transport elements is limited by stop means.

21. A machine according to claim 20, in which the stop means comprises abutting parts of the adjustable support and the movable support.

22. A machine according to any one of claims 13 to 21, in which adjustment of the adjustable support does not alter the relative positions of the pair of fibre transport elements.

23. A machine according to any preceding claim, in which the, or one of the, said at least one of the fibre transport elements of the intake device is a feed roller.

24. A machine according to any preceding claim, in which the, or one of the, said at least one of the fibre transport elements of the intake device is a feed tray.

25. A machine according to any preceding claim, in which the intake device comprises a feed roller and a feed tray with which the feed roller cooperates.

26. A machine according to claim 25, in which the feed roller is arranged above the feed tray.

27. A machine according to claim 25, in which the feed tray is arranged above the feed roller.

28. A machine according to any preceding claim, in which adjustment of the distance between at least one of the fibre transport elements of the intake device and the opener device is adjustment of the distance between a point at which fibre leaves said at least one of the fibre transport elements and a point at which fibre arrives at said opener device.

29. A machine according to any preceding claim, in which the intake device is mounted on a pair of walls of a frame, the walls being on opposite sides of the apparatus.

30. A machine according to claim 29, in which at least one of the walls of the frame has a through opening and means for adjusting the distance between the at least one of the fibre transport elements of the intake device and the opener device is provided on the outside of the frame in the region of the opening.

31. A machine according to claim 30 when dependent upon claim 13, in which a through opening is also provided in the adjustable support and the other of the pair of fibre transport elements passes through the through opening and is mounted in the movable support.

32. A machine according to any preceding claim, in which the opener device comprises at least one opener roller.

33. A machine according to any preceding claim, further including a cleaning device associated with the opener device.

34. A machine according to claim 33 when dependent upon claim 32, in which the opener device comprises a plurality of opener rollers and the cleaning device comprises one or more cleaning assemblies associated with the opener rollers.

35. A machine for feeding fibre material in the form of flocks, the apparatus being substantially as herein described with reference to Fig. 1, or Figs. 2a, 2b, 3a, 3b, 4a, 4b, 5a and 5b, or Figs. 6a, 6b, 7a, 7b, 8a and 8b, or Fig. 9, or Fig. 10, or Fig. 11, or Fig. 12, or Figs. 13a and 13b of the accompanying drawings.

36. A machine according to any preceding claim, including a pneumatic fibre conveying line for removing fibres opened by the machine.

37. A method of feeding fibre to an opening machine, the method employing a machine according to any one of claims 1 to 36.

The Patent Office

95

Application No:	GB 9811391.3	**Examiner:**	G WERRETT
Claims searched:	1-37	**Date of search:**	24 June 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): D1N.

Int Cl (Ed.6): D01G.

Other: Online:WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE FOUND	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.